

- 8 -

Remarks

This application has been reviewed in light of the Office Action of March 5, 2009. Claims 1-26 are pending. Claims 3, 5, 7, 9, and 10 are withdrawn from consideration, and claims 1, 2, 4, 6, 8, and 11-26 are rejected. In response, claim 1 is amended, claims 27-29 are added, and the following remarks are submitted.

Applicant asks that the examiner withdraw the restriction as to claims 3, 5, 7, 9, and 10, because these claims have effectively been examined. Claim 3 recites that the hot region is a structural portion of the aircraft, and the rejections based on Herlik, Loucks, MacDonald, and Space Shuttle all permit structural portions of the aircraft to be the hot region. Claim 5 provides that the source of the obscuring agent comprise a supply of the obscuring agent carried on board the aircraft, and the rejections based on Herlik, Loucks, MacDonald, and possibly Space Shuttle all argue that a supply of an obscurant is carried on board the aircraft. Claim 7 provides the source of the obscuring agent comprising a portion of the exhaust gas of a gas generating engine on the aircraft, and the rejection based on Space Shuttle argues this point in the sentence bridging pages 7-8 of the Office Action. Claim 9 recites providing carbon dioxide gas as the obscuring agent, and claim 10 recites providing water vapor as the obscuring agent. That is exactly what was said in relation to the rejection based on MacDonald.

Background of the Claimed Subject Matter

The following background aids understanding the context of the invention, and is drawn primarily from para. [0002]-[0004] of the Specification and other locations of the Specification set forth below.

Man-portable infrared-guided missile systems are widely available throughout the world to terrorists, at relatively low cost. When the infrared-guided missile is used to attack an aircraft, the seeker of the guidance system of the missile acquires a heat source of the aircraft, typically associated with the main propulsion engines. The missile is fired and guided to the target by the large infrared signature of the heat source.

- 9 -

An aircraft is particularly vulnerable to such an attack during takeoff and landing, when it is flying at low altitude and relatively slowly. The area within the security perimeter of an airport is usually secure. However, a terrorist may fire an infrared-guided missile at the aircraft from a hidden location several miles outside the airport security perimeter but near the takeoff flight path or the landing glide path. The seeker of the missile is typically sufficiently sensitive that it can acquire and home on the aircraft heat source from such distances. It is difficult for the aircraft to identify the missile threat, even if the aircraft has an infrared-source detector on board. There are many other infrared sources, such as factories and fires, present and visible from the aircraft during the low-level flight of takeoff and landing, which can confuse the infrared-source detector. Additionally, it is difficult for the aircraft to take evasive action when it is flying at low altitude and slowly, as occurs during takeoff and landing.

To protect against such attacks, either in low-level or high-level flight, many military aircraft carry flares that may be deployed if an infrared threat is sensed. The deployed flares create an alternative target to draw the attention of the missile seeker away from the aircraft. The use of flares for civilian aircraft such as commercial transport aircraft is not generally feasible for at least three reasons. First, the flares are normally deployed only when a threat is sensed. The aircraft therefore must carry an infrared threat warning system, which is expensive and not always reliable in situations where there are many nearby heat sources on the ground. Second, civilian aircraft typically operate from airports that are much less secure than are military airfields, and are therefore at greater risk from terrorist attack, requiring a heavy use of flares. Third, the use of countermeasures such as flares on a widespread scale is not socially and environmentally acceptable for most civilian locations such as airports in and near large cities, because the flares draw too much attention of persons on the ground and because of the debris of the flares that may be dangerous and/or cause fires on the ground.

The present invention was therefore developed as an approach to protecting aircraft in flight, particularly low-level flight during takeoff and landing, from attack by infrared-guided missiles. The protection is afforded by common materials--typically water and carbon dioxide--that can be ejected by the aircraft so as to lie between the heat sources on the aircraft and an external viewing location that is associated with a greatest threat of an attack on the aircraft.

- 10 -

The obscuring agent that is ejected is water or carbon dioxide or a mixture, optionally with the addition of other obscurants. Some of the rejections are premised on the use of water and carbon dioxide for putting out fires, which are hot. However, water and carbon dioxide are used in those situations because they either remove heat (in the case of water) from the combustion or remove oxygen (in the case of carbon dioxide). They are not used to fight fires because they obscure the infrared energy produced by the heat source.

As stated in the present application at many locations such as para. [0012], "The obscuring agent thereby absorbs infrared energy that would otherwise reach the external viewing location and serve as the infrared signature which a missile seeker may use to acquire and home in on the aircraft. The obscuring agent does not act in the manner of a quench to cool the infrared source." Para. [0028] explains "When cool, carbon dioxide gas and water vapor are strong infrared absorbers".

That is, the water and carbon dioxide are ejected to lie between the heat source on the aircraft and the likely missile threat location to provide a "screen" that reduces the amount of infrared energy that can reach the missile seeker from the heat source on the aircraft. They do not cool the infrared source on the aircraft, which in the case of the main propulsion affects its efficiency.

Water and carbon dioxide do not cause concern when they are used above civilian population areas near airports, because they are naturally occurring in the environment. Thus, the present approach protects the aircraft from attack by an infrared-guided missile but does not require the use of socially unacceptable chemicals or flare-type devices that may be objectionable when used over and in civilian communities.

Objections and Rejections Not Based in the Prior Art

Ground 1. The drawings are objected to on the ground that every feature of the invention specified in the claims is not shown. Applicant traverses this ground of rejection.

The explanation of the rejection is garbled, stating: "Therefore, the manner in which an external viewing location that is associated with a greatest threat of an attack on the aircraft must be shown or the feature(s) canceled from the claim(s)." This statement

- 11 -

cannot be understood, as it speaks of showing a "manner".

Applicant believes that the explanation of the rejection is attempting to argue that the external viewing location associated with a threat of attack is not shown in the drawings, and will so respond. If this understanding is not correct, Applicant asks that the Examiner restate the explanation of the rejection so that it may be understood, in a new nonfinal rejection.

Element 56 of the present application is the external viewing location that is associated with a threat of an attack on the aircraft. See, for example, the discussions of para. [0006]-[0007], [0012]-[0016], [0024], [0030]-[0034], and [0036]-[0037] of the Specification.

The external viewing location 56 is illustrated in Figures 2-6 in relation to the ejection of flow of an obscuring agent 46 from dispensing locations 54.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection or, failing to do so, clarify it so that the Examiner's concerns may be understood..

Ground 2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. Applicant traverses this ground of rejection.

Applicant has amended claim 1 to remove the recitation of "greatest".

New claims 27-28 have been added. These claims recite the language used in the specification, see para. [0013], [0015], [0036].

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

Ground 3. Claims 1, 2, 4, 6, 8, 11-16, and 23-26 are rejected under 35 USC 112, first paragraph, as failing to comply with the written description requirement. Applicant traverses this ground of rejection.

Ground 4. Claims 1, 2, 4, 6, 8, 11-16, and 23-26 are rejected under 35 USC 112, first paragraph, as failing to comply with the enablement requirement. Applicant traverses this ground of rejection.

Ground 5. Claims 1, 2, 4, 6, 8, 11-16, and 23-26 are rejected under 35 USC 112, second paragraph, as being indefinite. Applicant traverses this ground of rejection.

- 12 -

There is no explanation of the basis for these rejections given at the locations where the Ground 3 and Ground 4 rejections are stated. At paragraph 9 of the Office Action, following the Ground 5 rejection, a basis is stated. Applicant will take the basis stated in paragraph 9 of the Office Action to be the basis for all three of Grounds 3-5. This basis has been changed from that set forth in earlier office actions, a portion of which had to do with the aircraft being in flight. This prior basis of whether the aircraft was in flight has apparently now been withdrawn, and need not be addressed further.

The rejection of Grounds 3-5 is now based entirely on the matter of "determining of an external viewing location that is associated with a greatest threat of an attack on the aircraft."

Applicant has amended claim 1 to remove the limitation as to "greatest", and instead recites "determining an external viewing location that is associated with a threat of an attack on the aircraft". New claims 27-28 use the language from the Specification, "most-probable external viewing location", see para. [0013], [0015], and [0036].

This limitation of amended claim 1 is disclosed in the Specification at multiple locations, including the following location: para. [0013], particularly third sentence stating "It is important to concentrate the obscuring agent in the lines of sight from the source of the infrared energy on the aircraft to the most-probable external viewing locations characterizing the areas of the greatest threat...".

Following the discussion of "providing the aircraft in flight" in para. [0007], the Specification goes on to identify the external viewing location that is associated with the greatest threat of an attack on the aircraft in flight. The primary thrust of the present disclosure is simply to inform the person of ordinary skill in the art that directionality of threat must be considered. By contrast, in most cases flare patterns are ejected independently of the direction of the threat--once a threat is identified, the flares are ejected in a preset pattern. The present Specification informs the person of ordinary skill that the directionality of the threat must be considered and determined, because the ejection locations are chosen so that the ejected obscurant lies between the hot spots on the aircraft and the direction of greatest threat. Para. [0013]-[0015] set forth the basic approach:

"[0013] The present approach requires the judicious selection of the dispensing location(s) on the aircraft. The present invention does not seek

- 13 -

to select those dispensing locations in detail, but some general principles may be set forth here. It is important to concentrate the obscuring agent in the lines of sight from the source of the infrared energy on the aircraft to the most-probable external viewing locations characterizing the areas of the greatest threat, because the beneficial effect of the obscuring agent increases as its concentration in the line of sight increases. [emphasis added]

[0014] There is no need to provide obscuration of many parts of the aircraft, such as those that are at less than 150°C, which are so cool that they do not serve as significant infrared sources. The dispensing locations need not be positioned to obscure such cool-operating locations on the aircraft. The most significant infrared source on the aircraft is its engines, both the main propulsion engines and any auxiliary engines such as the auxiliary power unit, which emit hot exhaust gas. The hot carbon dioxide and water vapor in the hot exhaust gas, as well as the hot engine surfaces, are primary sources of the infrared signature of the aircraft, for example. The present approach will normally be applied to obscure the infrared emissions of the engines and their hot exhaust plumes. This may be done by dispensing the obscuring agent from dispensing locations just ahead of the hot surfaces and exhaust plumes of the engines, so that the obscuring agent flows between the hot surfaces and the exhaust plumes, on the one hand, and the most likely external viewing locations, on the other. The present approach allows the obscuring agent to be dispensed to obscure any other infrared sources on the aircraft that may also be present.

[0015] Another consideration of the dispensing location is the location of the most-probable external viewing locations. The infrared missile threats are most likely to come from below the aircraft in the takeoff/landing scenario of most interest, including locations in front of, laterally to, and behind the aircraft. The external viewing location of the threat is unlikely to be above the aircraft. The dispensing locations can therefore be tailored to provide the greatest obscuration below the aircraft, to its front, sides, and rear."

- 14 -

Para. [0033] further elaborates on this approach:

"Because the external viewing locations 56 are normally below the aircraft 30, the dispensing locations 54 for the main propulsion engines 38 may be concentrated so as to distribute the greatest amount of the obscuring agent 46 to obscure lines of sight to external viewing locations 56 which are below, and also in front of, on the sides of, and behind the aircraft 30."

Applicant has therefore informed the person of ordinary skill that directionality of threat must be considered, and provided in the Specification the determination of the external viewing location that is associated with a threat of an attack on the aircraft, in the situation of most interest of takeoff and landing of the aircraft.

In other cases, there may be other viewing locations associated with the greatest (most probable) threat. For example, if an airport is laid out so that an aircraft takes off over the ocean with land close on the right hand side, then the right hand side of the aircraft may be the "external viewing location that is associated with a greatest threat of an attack on the aircraft". Applicant cannot identify all possible threat directions, but has done so for the general takeoff/landing scenario of most interest, and given the guidelines for other scenarios.

The thrust of the rejection is that those of ordinary skill in the art using the airport will not be able to figure out the viewing locations that are associated with the greatest threats of an attack by an infrared guided missile. With the guidance of the present Specification, Applicant submits that is not the case.

At page 4, lines 8-10, the explanation of the rejection argues that "The specification never discloses an apparatus or steps for determining an external viewing location." At para. [0013] and [0015], the Specification explains that determination of the external viewing location depends upon the situation of the aircraft. Threats from viewing locations below the aircraft are of particular concern during takeoff and landing.

At page 4, lines 11-14, some rhetorical questions are asked. One relates to "greatest" threat of attack. Applicant has now removed this term from claim 1, and uses the correct term from the specification, "most-probable", in claims 27-28. Applicant explains how the "most-probable" external viewing locations are determined. However, as noted in

- 15 -

para. [0013], Applicant cannot specify the viewing locations or most-probably viewing locations for all circumstances. These will be known to the persons skilled in the art whose lives are on the line, specifically the aircraft crew, as explained above. The present application is addressed to such persons skilled in the art.

Prior Art Rejections

Before addressing the art rejections of Grounds 3-6, Applicant notes that none of the prior art deals with the subject matter of the invention, "A method for obscuring an aircraft from infrared detection from an external viewing location". Most of the prior art deals with something else, such as firefighting or noise suppression, and the Examiner seeks to fit them into the present claim language. The strained nature of these interpretations will be apparent from the following discussion.

Loucks does deal with attacks on aircraft, but proposes an approach diametrically opposite to that of the present invention. Loucks cools off the hot structure rather than obscures the hot structure without cooling it. The Loucks approach results in a loss of thermodynamic efficiency.

Ground 6. Claims 1, 2, 4, 6, 11, 15, 16, 17, 18, 19, 22, 23, 24, and 26 are rejected under 35 USC 102 as anticipated by Cowan US Patent 5,428,954. Applicant traverses this ground of rejection.

Legal requirement for a sec. 102 rejection

The following principle of law applies to sec. 102 rejections. MPEP 2131 provides: "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. The identical invention must be shown in as complete detail as is contained in the ... claim. The elements must be arranged as required by the claim..." [citations omitted] This is in accord with the decisions of the courts. Anticipation under section 102 requires 'the presence in a single prior art disclosure of all elements of a claimed invention arranged as in that claim.' Carella v. Starlight Archery, 231 USPQ 644, 646 (Fed. Cir., 1986), quoting Panduit

- 16 -

Corporation v. Dennison Manufacturing Corp., 227 USPQ 337, 350 (Fed. Cir., 1985)

Thus, identifying a single element of the claim which is not disclosed in the reference is sufficient to overcome a Sec. 102 rejection.

Cowan discloses a system for suppressing engine noise. There is no disclosure of any approach for "obscuring an aircraft from infrared detection from an external viewing location". Claim 1 recites in part:

"determining an external viewing location that is associated with a threat of an attack on the aircraft;"

Cowan does not disclose external viewing locations or threats of an attack on the aircraft.

Claim 1 further recites in part:

"ejecting the obscuring agent from a dispensing location on the aircraft so as to flow between the hot region and the external viewing location, wherein the obscuring agent has a temperature of less than that of the hot region."

Cowan seeks to prevent the escape of engine noise in all lateral directions--there is no concept or disclosure of a viewing location or a directionality of noise suppression.

Claim 17 recites in part:

"providing on the aircraft a source of an obscuring agent, wherein the obscuring agent comprises a mixture of carbon dioxide gas and water vapor"

Cowan has no such disclosure of a source of a mixture of carbon dioxide gas and water vapor on the aircraft.

Claim 17 also recites in part:

- 17 -

"ejecting the obscuring agent from a dispensing location on the aircraft so as to flow between the hot region and the external viewing location, wherein the obscuring agent has a temperature of less than that of the hot region, and wherein the dispensing location is on an engine nacelle of the aircraft forward of an aft end of an engine contained within the nacelle, or on a wing of the aircraft, or on a fuselage of the aircraft just ahead of an auxiliary power unit."

Cowan has no such disclosure. Cowan takes care to inject from the aft end of the engine nacelle, at a location coplanar with the plane of the exhaust nozzle (col. 3, lines 34-41, see also col. 5, lines 16-18).

Claim 22 recites in part:

"ejecting the obscuring agent from a dispensing location so as to flow between the hot region and the external viewing location but not to cool the hot region..."

Cowan has no such disclosure, and in fact specifically teaches that the hot region is cooled, see col. 4 lines 24-28.

Claim 22 further recites in part:

"the dispensing location is on an engine nacelle of the aircraft forward of an aft end of an engine contained within the nacelle, or on a wing of the aircraft, or on a fuselage of the aircraft just ahead of an auxiliary power unit."

Cowan has no such disclosure. Cowan takes care to inject from the aft end of the engine nacelle, at a location coplanar with the plane of the exhaust nozzle (col. 3, lines 34-41, see also col. 5, lines 16-18).

- 18 -

Ground 7. Claims 1, 2, 4, 14, 15, and 16 are rejected under 35 USC 102 as anticipated by Herlik US Patent 5,549,259. Applicant traverses this ground of rejection.

Claim 1

Claim 1 recites in part:

"determining an external viewing location that is associated with
a threat of an attack on the aircraft"

Herlik discloses a method and structure for aerial fire fighting. It does not deal with threats to an aircraft, and accordingly there is no disclosure of "determining" as recited above.

The position of the explanation of the rejection is that "Herlik discloses a method of obscuring an aircraft from infrared detection from an external viewing location". This argument, though novel and creative, is without any support in the reference. In any event, Herlik has no disclosure of "determining an external viewing location that is associated with a greatest threat of an attack on the aircraft", nor does the explanation of the rejection identify any such disclosure in Herlik. The explanation of the rejection argues that "A viewing location is established within the stream of fluid", but there is no reference to a source in Herlik of such a disclosure. Herlik does not disclose any attempt to view the aircraft from within the stream of fluid or from anywhere else for that matter.

Claim 1 further recites in part:

"ejecting the obscuring agent from a dispensing location on the aircraft so as to flow between the hot region and the external viewing location, wherein the obscuring agent has a temperature of less than that of the hot region."

Because no "external viewing location" is determined by Herlik, it is not possible

- 19 -

to eject the obscuring agent between the hot region and any external viewing location.

The explanation of this sec. 102 rejection, and of the other sec. 102 rejections, reflect a misconception about the nature of a sec. 102 rejection. As quoted above from MPEP 2131, a claim is anticipated only if each and every element as set forth in the claim is found in a single prior art reference. The construction of a sec. 102 rejection is not an invitation for the examiner to speculate in an attempt to create disclosure that is not found in the reference, to support a hindsight reconstruction of the present claims. The earlier-stated arguments about fire being an "attack" and the present argument that a viewing location could be established in the stream of fluid are not disclosures found in the reference. They are speculations made in a hindsight attempt to force a favorable interpretation upon an unrelated disclosure. In any event, there is no disclosure of a determination of an external viewing location that is associated with a greatest threat of an attack on the aircraft, a recited claim limitation. The explanation of a sec. 102 rejection must point to the location in the reference of every disclosed limitation of the claim under consideration, and that has not been done here for any of the grounds of rejection.

Claims depending from claim 1 contain these same limitations, and other limitations as well that distinguish their claimed subject matter.

Claim 2

Claim 2 recites a "transport aircraft". Herlik has no disclosure of a transport aircraft.

Claim 4

Claim 4 recites "providing the aircraft wherein the hot region is a plume of hot gas flowing from the aircraft." Herlik has no disclosure that the hot region being obscured is a plume of hot gas flowing from the aircraft.

- 20 -

Claim 14

Claim 14 recites "ejecting the obscuring agent so as to obscure a portion of an exhaust gas of an auxiliary power unit of the aircraft." Herlik does not mention an auxiliary power unit.

Claim 15

Claim 15 recites "ejecting the obscuring agent so as to obscure a portion of an exhaust gas of a main propulsion engine of the aircraft.". Herlik does not disclose any attempt to obscure a portion of the exhaust gas of a main propulsion of the aircraft.

Claim 16

Claim 16 recites "ejecting the obscuring agent at a temperature of less than about 150°C." Herlik does not mention the ejection temperature of any obscuring agent.

The explanation of the rejection does not mention any of these claims or any of the claim limitations. The Board can only await their discussion in the Examiner's Answer.

Ground 8. Claims 1, 2, 4, 15, 22, 23, 24, and 26 are rejected under 35 USC 102 as anticipated by Loucks US Patent 5,269,132. Applicant traverses this ground of rejection.

Applicant incorporates the requirements for a sec. 102 rejection from the discussion above.

Claim 1

Claim 1 recites in part:

"determining an external viewing location that is associated with

- 21 -

a greatest threat of an attack on the aircraft"

Loucks has no such disclosure, nor does the explanation of the rejection assert that Loucks has such a disclosure or point out a location in Loucks where there is such a disclosure.

Claim 1 recites in part:

"providing on the aircraft a source of an obscuring agent, wherein the obscuring agent comprises carbon dioxide gas, or water vapor, or a mixture thereof;"

Loucks discloses the use of a coolant (col. 3, lines 32-54) but not an obscuring agent. As discussed at col. 3 lines 45-48 of Loucks, the coolant functions by reducing the temperature of the engine surfaces and then mixes into the exhaust gas to cool the exhaust. This will have a direct negative effect on the thermodynamic efficiency of the engine, resulting in reduced power at the time it is needed the most, takeoff.

Para. [0012] of the Specification discusses and distinguishes such approaches:

"The obscuring agent does not act in the manner of a quench to cool the infrared source...This approach reduces the thermodynamic efficiency of the engine and requires such a large amount of coolant that the aircraft operation may be economically infeasible. The obscuring agent instead acts to block the infrared energy in the line of sight between its source and the external viewing location."

Claim 1 further recites in part:

"ejecting the obscuring agent from a dispensing location on the aircraft so as to flow between the hot region and the external viewing location, wherein the obscuring agent has a temperature of less than that of the hot region."

- 22 -

Loucks has no such disclosure.

Claims depending from claim 1 contain this same limitation, and other limitations as well that distinguish their claimed subject matter.

Claim 2

Claim 2 recites a "transport aircraft". Loucks has no disclosure of a transport aircraft.

Claim 4

Claim 4 recites "providing the aircraft wherein the hot region is a plume of hot gas flowing from the aircraft." Loucks has no disclosure that the hot region being obscured is a plume of hot gas flowing from the aircraft.

Claim 15

Claim 15 recites "ejecting the obscuring agent so as to obscure a portion of an exhaust gas of a main propulsion engine of the aircraft". Loucks does not disclose any attempt to obscure a portion of the exhaust gas of a main propulsion of the aircraft with an obscuring agent that is between the exhaust gas and an external viewing location.

Claim 22

Claim 22 recites in part:

"ejecting the obscuring agent from a dispensing location so as to flow between the hot region and the external viewing location but not to cool the hot region"

Loucks expressly discloses that its approach cools the hot region, see col. 2, lines

- 23 -

16-27 and col. 3, lines 45-48. The whole point of the approach of Loucks is to cool the hot region to reduce its emissivity.

Claim 22 further recites in part:

"the dispensing location is on an engine nacelle of the aircraft forward of an aft end of an engine contained within the nacelle, or on a wing of the aircraft, or on a fuselage of the aircraft just ahead of an auxiliary power unit."

Loucks has no such disclosure. There is no disclosure in Loucks that any dispensing location is on the engine nacelle (or in Loucks' case, the cowling 12). Loucks passes a liquid coolant through the interior of the panels 4, and the liquid coolant leaves the panels 4 at their aft ends. Figure 1 of Loucks depicts the panels 4 through which the liquid coolant passes. The panels 4 are inside the cowling 12. The above-quoted language of claim 22 makes it clear that the dispensing location is on the nacelle that contains the engine, not on the engine itself.

Claims depending from claim 22 contain this same limitation, and other limitations as well that distinguish their claimed subject matter.

Claim 23

Claim 23 recites in part:

"providing the aircraft that does not carry flares and does not have an active infrared threat warning system."

There is no disclosure in Loucks of this negative limitation. The explanation of the rejection, in the next-to-last sentence on page 4 of the Final Office Action, argues that "The aircraft is not disclosed as having a flare or early warning system." That is not what is required to anticipate a negative limitation. There must be an explicit disclosure of the recited negative limitation. This requirement is not met by an absence of a

- 24 -

disclosure of a positive limitation.

Claim 24

Claim 24 recites in part:

"preferentially ejecting the obscuring agent to obscure most-likely lines of sight which are below, in front of, on the sides of, and behind the aircraft."

Loucks has no disclosure of this limitation, and the explanation of the rejection does not address it.

Claim 26

Claim 26 recites "ejecting the obscuring agent so that it is not initially mixed with the plume". From Figures 1 and 3 of Loucks, it appears that the vaporized coolant ejected by Loucks would be initially mixed with the plume from the engines." Cooling of the exhaust gas temperature will directly reduce engine performance, at the critical takeoff time.

Ground 9. Claims 1-11, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, and 25 are rejected under 35 USC 103 as unpatentable over "applicant's admissions in the specification". Applicant traverses this ground of rejection.

This ground of rejection relies on "applicant's admissions in the specification" (AAS). The attempted AAS relied on in forming the rejection does not legally qualify as prior art and may not be used in constructing the rejection.

MPEP 2129 I and II provide a straightforward, unambiguous instruction to examiners as to what may be used as prior art from the Specification. MPEP 2129 II states:

- 25 -

"Where the specification identifies work done by another as 'prior art,' the subject matter so identified is treated as admitted prior art."

This position is supported in the MPEP by a reference to *In re Nomiya*, "holding applicant's labeling of two figures in the application drawings as 'prior art' to be an admission that what was pictured was prior art relative to applicant's improvement".

That is, anything used as legal "prior art" in forming a rejection must be identified in the specification to have been done "by another" and must be labeled or described as "prior art" in haec verba.

The present Specification does not label or otherwise identify anything as "prior art" and/or "work done by another". Specifically, the material relied on as AAS at para. [0024], [0009], [0017], [0027], [and [0028] is not labeled or otherwise identified as either "work done by another" or "prior art". The present reliance on attempted AAS must be withdrawn to conform to MPEP practice.

If the Examiner has any basis for disputing that the AAS is not "prior art" pursuant to the requirements of MPEP 2129, it must be set forth if the rejection is maintained.

If the statements in the Specification are thought to express prior art, then a proper prior art reference must be supplied and applied.

Ground 10. Claims 12, 13, 20, and 21 are rejected under 35 USC 103 as unpatentable over "applicant's admission in the specification" and further in view of Shaffer US Patent 4,484,195. Applicant traverses this ground of rejection.

Applicant incorporates the discussion provided in relation to Ground 9. The AAS does not qualify as "prior art" and therefore cannot form the basis of the rejection.

If the statements in the Specification are thought to express prior art, then a proper prior art reference must be supplied and applied.

- 26 -

Ground 11. Claims 12, 13, 20, and 21 are rejected under 35 USC 103 as unpatentable over Cowan '954 and further in view of Shaffer '195. Applicant traverses this ground of rejection.

MPEP 2142, under ESTABLISHING A PRIMA FACIE CASE OF OBVIOUSNESS, provides: "To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. [citations omitted]. See MPEP para 2143-2143.03 for decisions pertinent to each of these criteria."

First requirement--there must be an objective basis for modifying or combining the teachings of the references

The first of the requirements of MPEP 2142 is that "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings". The present rejection is a sec. 103 combination rejection. To reach a proper teaching of an article or process through a combination of references, there must be stated an objective motivation to combine the teachings of the references, not a hindsight rationalization in light of the disclosure of the specification being examined. MPEP 2142, 2143 and 2143.01. See also, for example, In re Fine, 5 USPQ2d 1596, 1598 (at headnote 1) (Fed.Cir. 1988), In re Laskowski, 10 USPQ2d 1397, 1398 (Fed.Cir. 1989), W.L. Gore & Associates v. Garlock, Inc., 220 USPQ 303, 311-313 (Fed. Cir., 1983), and Ex parte Levengood, 28 USPQ2d 1300 (Board of Appeals and Interferences, 1993); Ex parte Chicago Rawhide Manufacturing Co., 223

- 27 -

USPQ 351 (Board of Appeals 1984). As stated in In re Fine at 5 USPQ2d 1598:

"The PTO has the burden under section 103 to establish a prima facie case of obviousness. [citation omitted] It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references."

And, at 5 USPQ2d 1600:

"One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."

Following this authority, the MPEP states that the examiner must provide such an objective basis for combining the teachings of the applied prior art. In constructing such rejections, MPEP 2143.01 provides specific instructions as to what must be shown in order to extract specific teachings from the individual references:

"Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention when there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992)."

* * * * *

"The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)."

* * * * *

- 28 -

"A statement that modifications of the prior art to meet the claimed invention would have been 'well within the ordinary skill of the art at the time the claimed invention was made' because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references. Ex parte Levengood, 28 USPQ2d 1300 (Bd.Pat.App.& Inter. 1993)."

Here, there is set forth no objective basis for combining the teachings of the references in the manner used by this rejection, and selecting the helpful portions from each reference while ignoring the unhelpful portions. An objective basis is one set forth in the art or which can be established by a declaration, not one that can be developed in light of the present disclosure.

In this case, Cowan deals with noise suppression for aircraft. There is no teaching of infrared suppression. Shaffer teaches infrared suppression. There is no teaching of noise suppression and no mention of aircraft. (Shaffer discloses using a Solar "Mars" gas turbine. There is no disclosure or teaching that the "Mars" gas turbine is used for aircraft, and Shaffer does not use it in relation to aircraft. If the explanation of the rejection continues to assert that Shaffer has any relation to aircraft, a factual basis for that assertion must be set forth. The testing by Shaffer was done on the ground and in nearly windless conditions, see col. 4, line 66-col. 5, line 4.) Cowan does not suggest that metal particles would improve noise suppression, and Shaffer does not suggest that an approach such as that of Cowan would improve infrared suppression.

The explanation of the rejection (page 10, lines 6-8) asserts that the combining of the teachings would be obvious in hindsight to a person seeking to reject the claims of the present application, but points to nothing in either reference, or elsewhere, that provides an objective or other basis for making such a combination.

If the rejection is maintained, Applicant asks that the Examiner set forth the objective basis found in the references themselves or elsewhere for combining the teachings of the references, and for adopting only the helpful teachings of each

- 29 -

reference and disregarding the unhelpful teachings of the reference. Thus, as it stands now, the invention as a whole is not *prima facie* obvious over the combined teachings of the prior art.

Second requirement--there must be an expectation of success

The second of the requirements of MPEP 2142 is an expectation of success. There is no expectation of success...This requirement has not been addressed in the explanation of the rejection, and in any event more than Examiner's argument is required here. The proposed modification cannot render the reference inoperable or unsatisfactory for its intended purpose, MPEP 2142, 2143.01, and MPEP 2143.02.

As stated in MPEP 2142, "The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. [citations omitted]."

There is no suggestion of an expectation of success of a combination of these two references, and the explanation of the rejection sets forth none.

Third requirement--the prior art must teach the claim limitations

The third of the requirements of MPEP 2142 is that "the prior art reference (or references when combined) must teach or suggest all the claim limitations." In this regard, the following principle of law applies to all sec. 103 rejections. MPEP 2143.03 provides "To establish *prima facie* obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)." [emphasis added] That is, to have any expectation of rejecting the claims over a single reference or a combination of references, each limitation must be taught somewhere in the applied prior art. If limitations are not

- 30 -

found in any of the applied prior art, the rejection cannot stand. In this case, the applied prior art references clearly do not arguably teach some limitations of the claims.

This analysis is conducted mindful of the legal standard for a section 103 rejection. Graham v. John Deere, 148 USPQ 459 (Sup. Ct., 1966) requires the following steps: (1) determine the scope and content of the prior art; (2) ascertain the differences between the prior art and the claims at issue; and (3) assess the level of skill in the art. Obviousness is determined against this background.

In determining obviousness, MPEP 706.02(j) requires (a) a statement of the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate, (b) a statement of the differences in the claim over the applied references; (c) the proposed modifications to the art reference to arrive at the claimed subject matter; and (d) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification. That procedure has not been followed in constructing the present rejection.

Claims 12 and 13 depend from independent claim 1, and incorporate its limitations. Claims 20 and 21 depend from independent claim 17, and incorporate its limitations.

Neither reference, alone or in combination, teaches the limitation of claim 1:

"determining an external viewing location that is associated with a greatest threat of an attack on the aircraft;"

Neither reference, alone or in combination, teaches the limitation of claim 17:

"ejecting the obscuring agent from a dispensing location on the aircraft so as to flow between the hot region and the external viewing location, wherein the obscuring agent has a temperature of less than that of the hot region, and wherein the dispensing location is on an engine

- 31 -

nacelle of the aircraft forward of an aft end of an engine contained within the nacelle, or on a wing of the aircraft, or on a fuselage of the aircraft just ahead of an auxiliary power unit."

Ground 12. Claim 14 is rejected under 35 UCS 103 as unpatentable over applicant's admission in view of Cowan '954. Applicant traverses this ground of rejection.

Applicant incorporates the discussion provided in relation to Ground 9. The AAS does not qualify as "prior art" and therefore cannot form the basis of the rejection.

If the statements in the Specification are thought to express prior art, then a proper prior art reference must be supplied and applied.

Ground 13. Claims 1, 2, 4, 6, 8, 12, 13, 14, 15, 23, and 24 are rejected under 35 USC 102 as anticipated by "Space Shuttle" together with the cited supporting documents to establish inherent design features. Applicant traverses this ground of rejection.

At the outset, several points of clarification are required.

First, Applicant requests clarification of the rejection if it is maintained. A sec. 102 rejection must be based on the disclosure contained within a single reference. Applicant is not certain what reference is intended to be described as "Space Shuttle". Is it the alleged photographs of the space shuttle that are found on pages 13-16 of the Office Action, or is it one of the references u-x on PTO-892 attached to the Office Action of June 28, 2005, or is it one of the references u-v of the form PTO-892 attached to the present Office Action, or something else. There are technically inaccurate statements in the explanation of the rejection, suggesting yet some other source for this alleged information. Applicant previously requested this clarification, but no clarification was provided. Clarification is required as to exactly what single document is the basis of this rejection, and exactly which documents are said to be the "supporting documents". As it is now, the rejection as set forth is indefinite.

- 32 -

Second, to the extent that the photographs on pages 13-16 of the Office Action are relied upon, their source and date must be identified, as there is no reason to believe they are authentic, unmodified photographs of the space shuttle. The explanation of the rejection relies on the photographs (Office Action, page 12, lines 3-5 and elsewhere). It also must be factually established whether these photographs are made in the visible or infrared spectra. Comments about obscuring in the infrared based upon the photographs are invalid, if the photographs are made in the visible range.

Third, there is no showing that the documents relied upon, whatever they are, are in fact "prior art". The origin of the photographs on pages 13-16 of the Office Action has not been provided, so there is no way of knowing if they are prior art. Documents u-v of the form PTO-892 attached to the present Office Action indicate dates of 3/2/09, which is nearly 6 years after the present application was filed. Some or all of the documents u-x listed on form PTO-892 attached to the Office Action of June 28, 2005 are indicated to have dates after the filing of the present application, or less than a year prior to its filing. Evidence as to the actual effective date of each and every publication and photograph that is relied upon is required.

Fourth, the explanation of the rejection in the sentence bridging pages 10-11 of the present Office Action states, "The shuttle has remained the same for about 30 years with the exception of O-ring and crew safety design changes that have no bearing on the applicant's claimed invention." No factual support is provided for this statement. Applicant cannot find support for this statement in any of the cited references dealing with the space shuttle. The objective of this statement is apparently to avoid discussion of major changes that render it impossible to somehow combine the information in the various references dealing with the space shuttle. Applicant requests that Examiner provide full support for the quoted statement, which may come as a surprise to NASA and industry engineers who have performed extensive modifications to the SSTS since it was introduced.

Fifth, the attempt to state the explanation of the rejection is technically incorrect. There is confusion about the interrelation of the SSMEs and the SRBs, and how they might relate to the present invention. Clarification to a technically accurate statement is required.

- 33 -

Sixth, the explanation of the rejection has some assertions that are not based in any disclosure of the references, as far as Applicant can find, such as the assertion that there have been attempts to intercept the space shuttle by terrorist aircraft. Support for these statements must be set forth, with reference to the prior art that supports them. If they are true, there are undoubtedly statements in the press about the attempts.

Seventh, the explanation of the rejection does not address the claim limitations. Applicant requests that the explanation of the rejection be revised to do so.

Applicant requests that this ground of rejection and its explanation, if maintained, be revised as indicated above and the necessary facts be established by reference to actual prior art and authenticated photographs shown to be in the proper wavelength range, and that a new nonfinal ground of rejection with explanation be set forth so that Applicant may fairly respond.

Applicant incorporates the requirements for a sec. 102 rejection from the discussion of Ground 6.

Because the statement of this rejection is ambiguous, unclear, confusing, and legally unsupported for at least the reasons stated above, Applicant cannot fully respond. Applicant will assume *arguendo* that all of the references are actually prior art, pending a demonstration that they are in fact prior art, and authentication of the alleged photographs on pages 13-16 of the Office Action. Applicant will do its best to guess what the rejection is about, but requires clarification as stated above. The explanation of the rejection speaks of "terrorist aircraft...attempting to intercept the Space Shuttle". There is no support in any of the references for this assertion that terrorist aircraft have attempted to intercept the space shuttle.

Claims 1, 2, 4, 8, 24

Claim 1 recites in part:

"determining an external viewing location that is associated with
a threat of an attack on the aircraft;"

- 34 -

Space Shuttle may disclose an earth-launched space vehicle. It does not appear to deal with threats of an attack to the space shuttle, and accordingly there is no disclosure of the "determining" step as recited above. The explanation of the rejection does not address this limitation in any meaningful way, and does not point out in any of the supporting documents where there is a disclosure of this limitation. Stating the explanation of a sec. 102 rejection is not an invitation for the Examiner to engage in unsupported speculation about an asserted terrorist aircraft attempting to intercept the Space Shuttle and the like, but requires that each claim limitation be analyzed in light of the single applied reference to determine if that reference discloses the claim limitation. If some elements are said to be "inherent", their inherency contemporaneous with the other references must be established, and other requirements of arguing inherency must be met.

Claim 1 further recites in part:

"providing on the aircraft a source of an obscuring agent, wherein the obscuring agent comprises carbon dioxide gas, or water vapor, or a mixture thereof"

The explanation of the rejection combines liquid hydrogen, liquid oxygen, and solid propellant into a mix that does not occur in reality, and does not differentiate the heat source from the obscuring agent. Clarification is required. If the obscuring agent is said to be the "great clouds of exhaust material" produced by the SRBs, there is no showing that the combustion product is carbon dioxide gas or water vapor. If the obscuring agent is said to be the exhaust of the SSMEs, the photo on page 16 of the Office Action appears to show that it is transparent at least to visible light.

Instead, the Examiner takes a position about "inherent" features. MPEP 2112-2113 sets forth the law on inherency. Inherency is not to be taken lightly and not to be asserted unless there is good evidence to suggest that the asserted property or characteristic is necessarily present in the teachings of the prior art reference. The concept of inherency is not provided as a way to fill in the gaps in missing disclosure or teachings based upon speculation, unless the asserted property or characteristic may

- 35 -

be shown to be necessarily present by objective evidence. Instead, "inherency" is used when every aspect of the disclosure of a reference and the claimed subject matter is otherwise exactly the same, then it may be inferred that some property or characteristic further recited in the claim must necessarily be present in the art reference. MPEP 2112 provides "The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993); In re Oelrich, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted) "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)" If the rejection is maintained, the Examiner must provide the basis for the assertion of inherency. Applicant does not know one way or the other, but if the Examiner asserts inherency, he must establish it as provided by MPEP 2112-2113.

Claim 1 also recites in part:

"ejecting the obscuring agent from a dispensing location on the aircraft so as to flow between the hot region and the external viewing location, wherein the obscuring agent has a temperature of less than that of the hot region."

None of the references disclose this limitation, nor has the explanation of the rejection pointed out where the references disclose this limitation. The external viewing location is the location associated with a threat of an attack on the aircraft. No threat

- 36 -

of attack on the shuttle by terrorist aircraft is discussed in any of the references dealing with the space shuttle.

Applicant appreciates the examiner's humor in the explanation of the rejection. Applicant cannot resist observing that a person standing under the engines during launch (Office Action, page 12, lines 3-6) would not view the plume created by the engines for very long.

Claims depending from claim 1 contain this same limitation, and other limitations as well that distinguish their claimed subject matter.

Claim 6

Claim 6 recites "providing the source of the obscuring agent comprising a supply of the obscuring agent generated on board the aircraft." Space Shuttle does not disclose that any obscuring agent is generated on board the aircraft.

Claim 12

Claim 12 recites in part: "providing solid-material particles in the obscuring agent." Again, the rejection is based on an assertion of "inherency". If the rejection is maintained, the Examiner must establish the inherency as discussed above.

Claim 13

Claim 13 recites "providing solid metal particles in the obscuring agent." Applicant notes that in the discussion of the various dependent claims, there is no reference to the source of the disclosure in any case. For example, regarding claim 13 (and claim 21 depending from claim 17), the article "Solid Rocket Booster" does not disclose the claim limitation, "providing solid metal particles in the obscuring agent". Aluminum may be present, but it is likely in a vaporous form. In any event, the reference must disclose that the aluminum (or other metal) is present in the form of particles. There is no such disclosure, nor does the explanation of the rejection point

- 37 -

to any such disclosure in the references. The explanation of the rejections of many of the other dependent claims suffer from the same problem.

Claim 14

Claim 14 recites "ejecting the obscuring agent so as to obscure a portion of an exhaust gas of an auxiliary power unit of the aircraft." Space Shuttle does not mention an auxiliary power unit. The explanation of the rejection observes that the shuttle has 3 main engines and 2 SRBs, but it does not discuss an auxiliary power unit.

Claim 15

Claim 15 recites "ejecting the obscuring agent so as to obscure a portion of an exhaust gas of a main propulsion engine of the aircraft.". Space Shuttle does not disclose any attempt to obscure a portion of the exhaust gas of a main propulsion of the aircraft.

Claim 23

Claim 23 recites in part:

"providing the aircraft that does not carry flares and does not have an active infrared threat warning system."

There is no disclosure in Space Shuttle of this negative limitation. Para. 27 of the Final Office Action argues that "The references provided do not disclose the shuttle having flares or infrared threat warning system." That is not what is required to anticipate a negative limitation. There must be a disclosure of the recited negative limitation. This requirement is not met by an absence of a disclosure of a positive limitation.

Despite the fact that this application has been in prosecution for nearly 6 years, the Examiner has not found any prior art references that deal with the subject matter of the present invention. Instead, the references deal with noise suppression of jet engines, fire fighting, applications that have no disclosed relation to aircraft, cooling the engine and/or exhaust plume but not obscuring the IR signature, attempts to create "admissions" when none exist as a matter of law, and, incredibly, hypothetical terrorist attacks on the space shuttle. In the absence of prior art, arguments are made that the Specification is unclear, when it is perfectly clear to those skilled in the art, to whom this application is addressed. It should now be apparent that this application deals with patentable subject matter. It should be allowed so that its benefits may be fully utilized for the benefit of aircraft endangered by possible attacks with IR-guided missiles, rather than delayed still further.

Applicant respectfully requests that the examiner reconsider and withdraw the rejections and allow the case to issue.

Respectfully submitted,



Panchanathan Reghunathan

Reg. No. 62,127

Attorney for Applicant